Blood pressure in acute stroke

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Although great advances have been made in stroke medicine in the past two decades, some questions about treatment in the acute phase of stroke remain. One such question is how to manage blood pressure? Blood pressure is often increased in acute ischaemic and haemorrhagic stroke,[1] and findings from epidemiological studies suggest that high blood pressure in the acute phase is associated with poor outcome.[1] The results of three large randomised clinical trials on blood pressure lowering in acute stroke—the Chinese Antihypertensive Trial in Acute Ischaemic Stroke[2], the Intensive Blood Pressure Reduction in Acute Cerebral Haemorrhage Trial (INTERACT-2),[3] and the Scandinavian Candesartan Acute Stroke Trial[4]—suggest that treatment should differ according to the type of stroke.

In *The Lancet Neurology,* findings from two Articles provide new evidence for the importance of blood pressure in acute stroke. In one study, using data from the population-based Oxford Vascular Study, Urs Fischer and colleagues compared prestroke blood pressure values with blood pressure measured in the acute phase, and assessed whether this differs in ischaemic versus haemorrhagic stroke.[5] Patients with intracerebral haemorrhage had a steeper rise in blood pressure, higher blood pressure in the acute phase, and a more substantial fall within the first 24 h than did patients with ischaemic stroke.[5]

In the other study, Lisa Manning and colleagues did a post-hoc analysis of the INTERACT-2 trial—a randomised trial of intensive versus guideline blood pressure lowering in acute intracerebral haemorrhage—assessing the prognostic significance of blood pressure variability in the hyperacute phase (first 24 h) and the acute phase (days 2–7) after intracerebral haemorrhage.[3,6] Episodic hypertension, single high systolic blood pressure, and variability of blood pressure in the hyperacute and the acute phases of an intracerebral haemorrhage were predictors of poor functional outcome.[6]

The findings from these two studies suggest that patients with ischaemic stroke caused by small-vessel disease, and patients with deep or posterior haemorrhages, have higher blood pressure after stroke than patients with other ischemic stroke aetiologies or lobar haemorrhages, and when compared with recent pre-morbid measurements also have a steeper increase in blood pressure.[5] These are important findings, indicating that the effects of blood pressure should be differentiated and managed, according to not only the type of stroke, but also to aetiology or lesion location. Such differentiation should be a key area for future research.

For clinicians, the data presented in the papers suggest that we should closely monitor blood pressure in acute stroke. In patients with intracerebral haemorrhage, we should strive to maintain blood pressure at a constant level. However, the investigators showed an association between increasing blood pressure variability and greater intensity of blood pressure-lowering treatment.[6] An intriguing question therefore remains: if high variability in blood pressure worsens outcome, and greater intensity of treatment increases variability, should blood pressure really be lowered? If so, how much should it be lowered and what is the best method to achieve the target level?

In ischaemic stroke, blood pressure variability has been previously associated with poor outcome,[7–9] and an association between high blood pressure and poor outcome has been shown in several populations.[1,8] However, there is no compelling evidence that lowering blood pressure is beneficial.[2,4] Therefore, the prognostic significance of blood pressure variability in acute ischaemic stroke is an important topic for further investigation.

The Articles in *The Lancet Neurology* add to the evidence suggesting that blood pressure management in haemorrhagic stroke is important, hence treatment should differ according to type of stroke, and sudden changes and variability in blood pressure should be avoided. Findings from two large stroke trials with an expected blood pressure-lowering effect are anticipated in 2014.[10,11] Both trials have included patients with either ischaemic or haemorrhagic stroke and will add important evidence regarding blood pressure management in the acute phase.

Else Charlotte Sandset
Department of Neurology, Oslo University Hospital, Postboks 4956 Nydalen, 0424 Oslo, Norway
else@sandset.net

I declare that I have no conflicts of interest.

1 Leonardi-Bee J, Bath PM, Phillips SJ, Sandercock PA. Blood pressure and clinical outcomes in the International Stroke Trial. *Stroke* 2002; **33:** 1315–20.
2 He J, Zhang Y, Xu T, et al. Effects of immediate blood pressure reduction on death and major disability in patients with acute ischemic stroke: the CATIS randomized clinical trial. *JAMA* 2014; **311:** 479–89.
3 Anderson CS, Heeley E, Huang Y, et al. Rapid blood-pressure lowering in patients with acute intracerebral hemorrhage. *N Engl J Med* 2013; **368:** 2355–65.
4 Sandset EC, Bath PM, Boysen G, et al. The angiotensin-receptor blocker candesartan for treatment of acute stroke (SCAST): a randomised, placebo-controlled, double-blind trial. *Lancet* 2011; **377:** 741–50.
5 Fischer U, Cooney MT, Bull LM, et al. Acute post-stroke blood pressure relative to pre-morbid levels in intracerebral haemorrhage versus major ischaemic stroke: population-based study. *Lancet Neurol* 2014; published online Feb 28. http://dx.doi.org/10.1016/S1474-4422(14)70031-6.
6 Manning L, Hirakawa Y, Arima H, et al. Blood pressure variability and outcome in acute intracerebral haemorrhage: post-hoc analysis of the INTERACT2 randomised controlled trial. *Lancet Neurol* 2014; published online Feb 13. http://dx.doi.org/0.1016/S1474-4422(14)70018-3.
7 Rothwell PM, Howard SC, Dolan E, et al. Prognostic significance of visit-to-visit variability, maximum systolic blood pressure, and episodic hypertension. *Lancet* 2010; **375:** 895–905.
8 Geeganage C, Tracy M, England T, et al. Relationship between baseline blood pressure parameters (including mean pressure, pulse pressure, and variability) and early outcome after stroke: data from the Tinzaparin in Acute Ischaemic Stroke Trial (TAIST). *Stroke* 2011; **42:** 491–93.
9 Endo K, Kario K, Koga M, et al. Impact of early blood pressure variability on stroke outcomes after thrombolysis: the SAMURAI rt-PA Registry. *Stroke* 2013; **44:** 816–18.
10 The ENOS Trial Investigators. Glyceryl trinitrate vs control, and continuing vs stopping temporarily prior antihypertensive therapy, in acute stroke: rationale and design of the Efficacy of Nitric Oxide in Stroke (ENOS) trial (ISRCTN99414122). *Int J Stroke* 2006; **1:** 245–49.
11 Saver JL, Starkman S, Eckstein M, et al. Methodology of the Field Administration of Stroke Therapy - Magnesium (FAST-MAG) phase 3 trial: Part 1—rationale and general methods. *Int J Stroke* 2014; **9:** 215–19.

Is screening of relatives for cerebral aneurysms justified?

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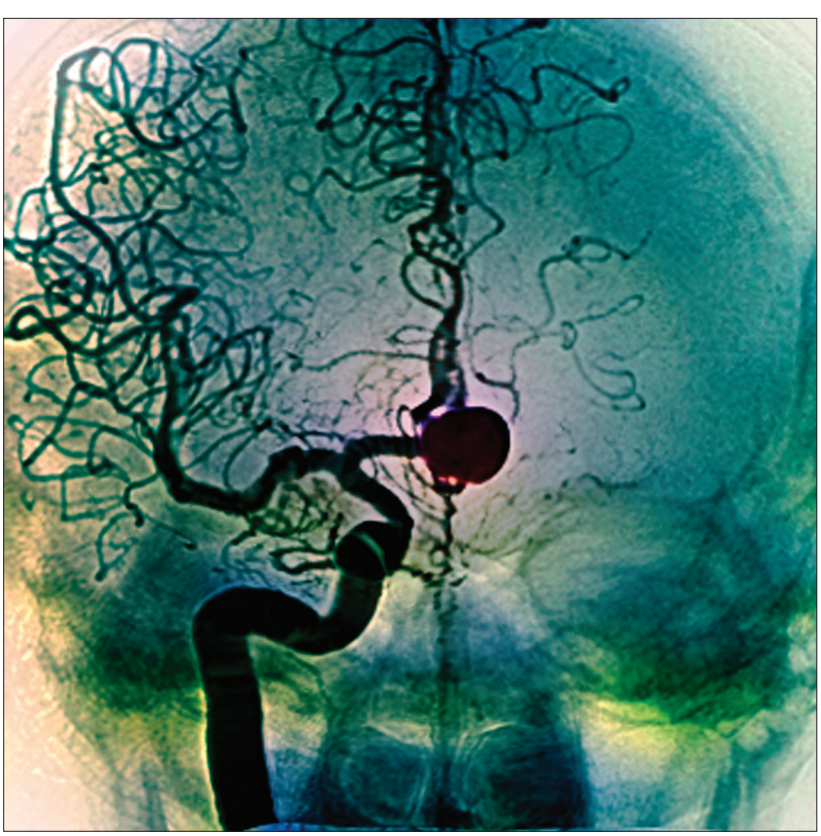
A great deal of anxiety is caused within a family when a relative has an aneurysmal subarachnoid haemorrhage (aSAH), particularly if the affected individual is young. If another member of the same family has had aSAH, the event provokes even greater anxiety. Inevitably, individuals start to question whether they could have an aneurysm and whether other family members will be affected too. Individuals with at least two first-degree relatives who have had aSAH have a significantly higher risk both of harbouring an aneurysm and of aSAH compared with the rest of the population[1]—in this large population-based study in Sweden, the odds ratio (OR) of aSAH was 2·1 if one first-degree relative had been affected and an OR of 51·0 with two affected first-degree relatives. Additionally, brain haemorrhages are also recorded at a younger age in individuals with a family history of aSAH than in those without.[2,3]

In *The Lancet Neurology*, Stijntje Bor and colleagues present findings from a 20-year period of screening for cerebral aneurysms in individuals with a family history of aSAH in the Netherlands.[4] Individuals aged 16–18 years or older with at least two first-degree relatives who had had aSAH were offered screening after counselling about possible side-effects and modifiable risk factors. Screening was mostly done with magnetic resonance angiography. After a negative screen, individuals were told to make contact after 5 years for repeated screening (although they were not actively called back).The authors report the yield of first and subsequent screens in a cohort of 458 individuals, who were followed up for up to 20 years. This cohort is unique, and the information provided by this series represents the best available information about screening for aSAH.

Aneurysms were identified in 51 (11%) of the 458 individuals at first screening and 21 (8%) of 261 individuals at second screening.[2] Overall, aneurysms



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